



MACHAKOS UNIVERSITY

University Examinations 2018/2019

SCHOOL OF PURE AND APPLIED SCIENCES

DEPARTMENT OF MATHEMATICS STATISTICS AND ACTUARIAL SCIENCE

FIRST SECOND SEMESTER EXAMINATION FOR

CRAFT CERTIFICATE IN ELECTRICAL ENGINEERING

CRAFT CERTIFICATE IN AUTOMOTIVE

1601/103: MATHEMATICS I

DATE: 16/4/2019

TIME: 8:30 – 11:30 AM

INSTRUCTIONS:

Answer all the questions

Show all your working clearly.

QUESTION ONE

- a) Simplify the following
- $69 \div \{6 + (3 \times 8 - 7)\}$
 - $2\frac{1}{2} \times 1\frac{1}{3} - \frac{3}{5} \div 1\frac{4}{11}$
 - $\frac{2a-4b}{4} - \frac{a-b}{3}$ (11 marks)
- b) The common ratio of a geometric progression is 2 and the sum of the first eight terms is 1020. Find the first term. (4 marks)
- c) Find the sum of the first 60 terms of the series $10+10.3+10.6+\dots$ (5 marks)

QUESTION TWO

- a) Solve the following equations
- $32^{x-3} \times 4^{x+3} = 128 \div 2^x$
 - $\text{Log}(5x+75) - 2 \log 3 = \log(2x-9)$ (12 marks)
- b) Calculate the compound interest on shs 7120 for 3 years at 11% per annum. (3 marks)
- c) Find the length of the shortest piece of string that can be cut into equal lengths, each 28cm, or 35cm or 42cm (5 marks)

QUESTION THREE

- a) Give that $A = \begin{pmatrix} 1 & 2 \\ -3 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ 1 & -1 \end{pmatrix}$
- $2A + 3B$
 - $(AB)^T$ (7 marks)
- b) Solve the equation for matrix R
- $$R + \begin{pmatrix} 4 & -5 \\ -3 & 6 \end{pmatrix} = \begin{pmatrix} -3 & 7 \\ -5 & 8 \end{pmatrix} \quad (4 \text{ marks})$$
- c)
 - Convert 11010_{two} to octal
 - Add $e7_{\text{twelve}}$ to $8t_{\text{twelve}}$
 - Multiply 243_7 by 35_7 (9 marks)

QUESTION FOUR

- a) Solve the following simultaneous equations using matrix method
- $$4x + 3y - 32 = 0 \text{ and } 3x - 2y = 7 \quad (8 \text{ marks})$$
- b) The 5th term of an A.P is 82 and the 12th term is 103. Determine
- The first term and the common difference
 - The sum of the first 21 terms (6 marks)
- c) Evaluate
- $(2^6 \times 64^{-\frac{1}{3}}) / (3^{-3} \times 81)$
 - $\log_2(1/4)$ (6 marks)

QUESTION FIVE

- a) $1/3$ of Joseph's books are the same in number as $3/4$ of John's, if John has 60 books how many has Joseph? (4 marks)
- b) Evaluate
- $3x^2 - 2xy + z^3$ when $x = -2$, $y = 2$ and $z = -1$
 - 27.19×0.573 and give the answer in standard form correct to 3 s.f. (6 marks)
- c) Use logarithms to evaluate
- $$\sqrt{0.0782 \times \frac{34.39}{4.836}} \quad (7 \text{ marks})$$
- d) State the number of significant figures in the following measures
- 6010 km
 - 42.058 s
 - 85000 cm^3 (3 marks)